

CLIMATE PROJECTIONS FOR THE SOUTH CENTRAL US

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ABOUT ME

Originally from Arkansas, but have resided in Oklahoma since 2009

Bachelors Degree in Meteorology from OU

Masters Degree in Geography from OU

University Assistant Director of the **USGS South Central Climate Adaptation Science Center**

Hobbies: **Wildlife Photography & Baking**



WHY USE FUTURE CLIMATE INFO?



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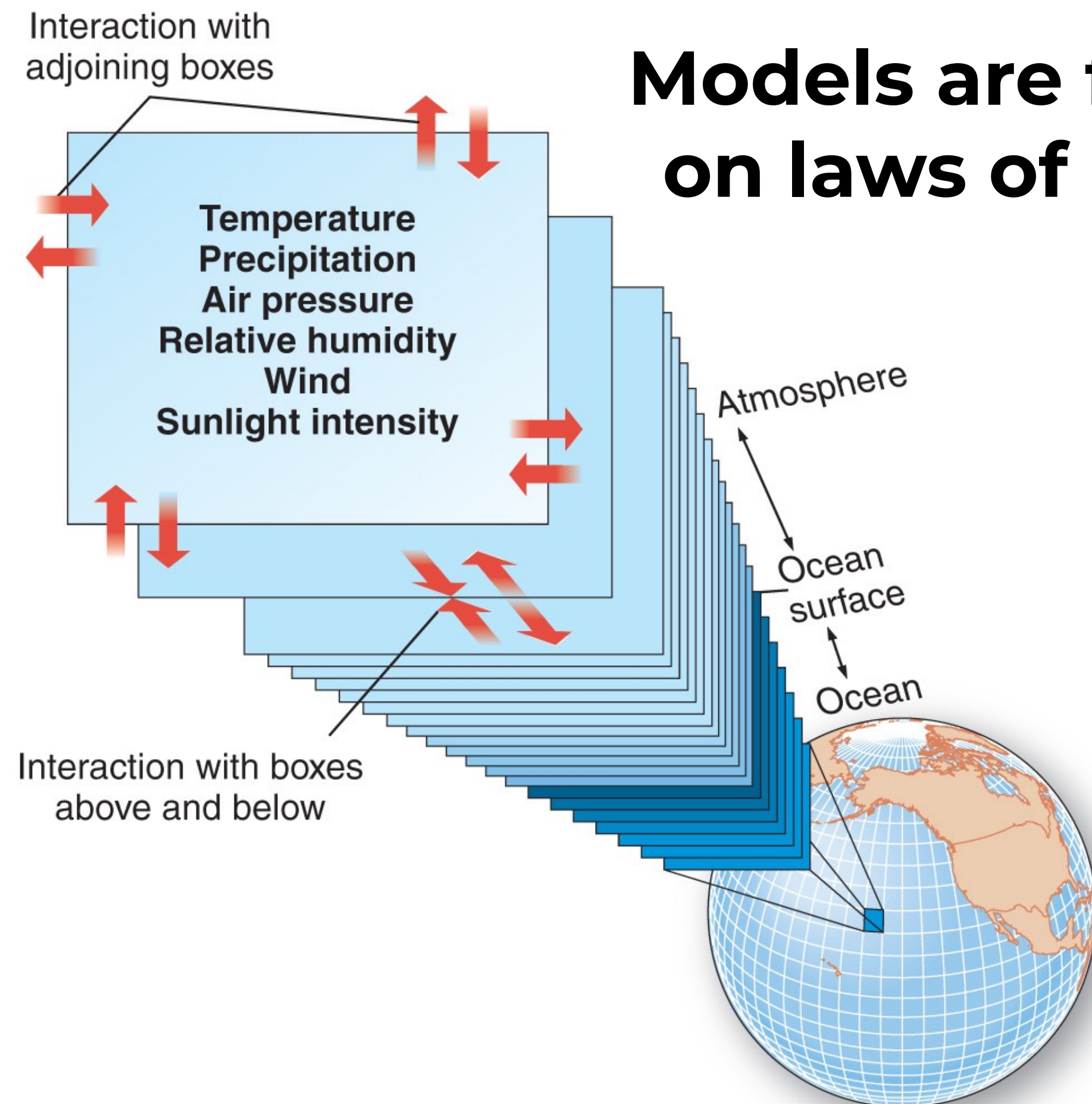


WHAT DOES THE FUTURE LOOK LIKE? & HOW DO WE KNOW?

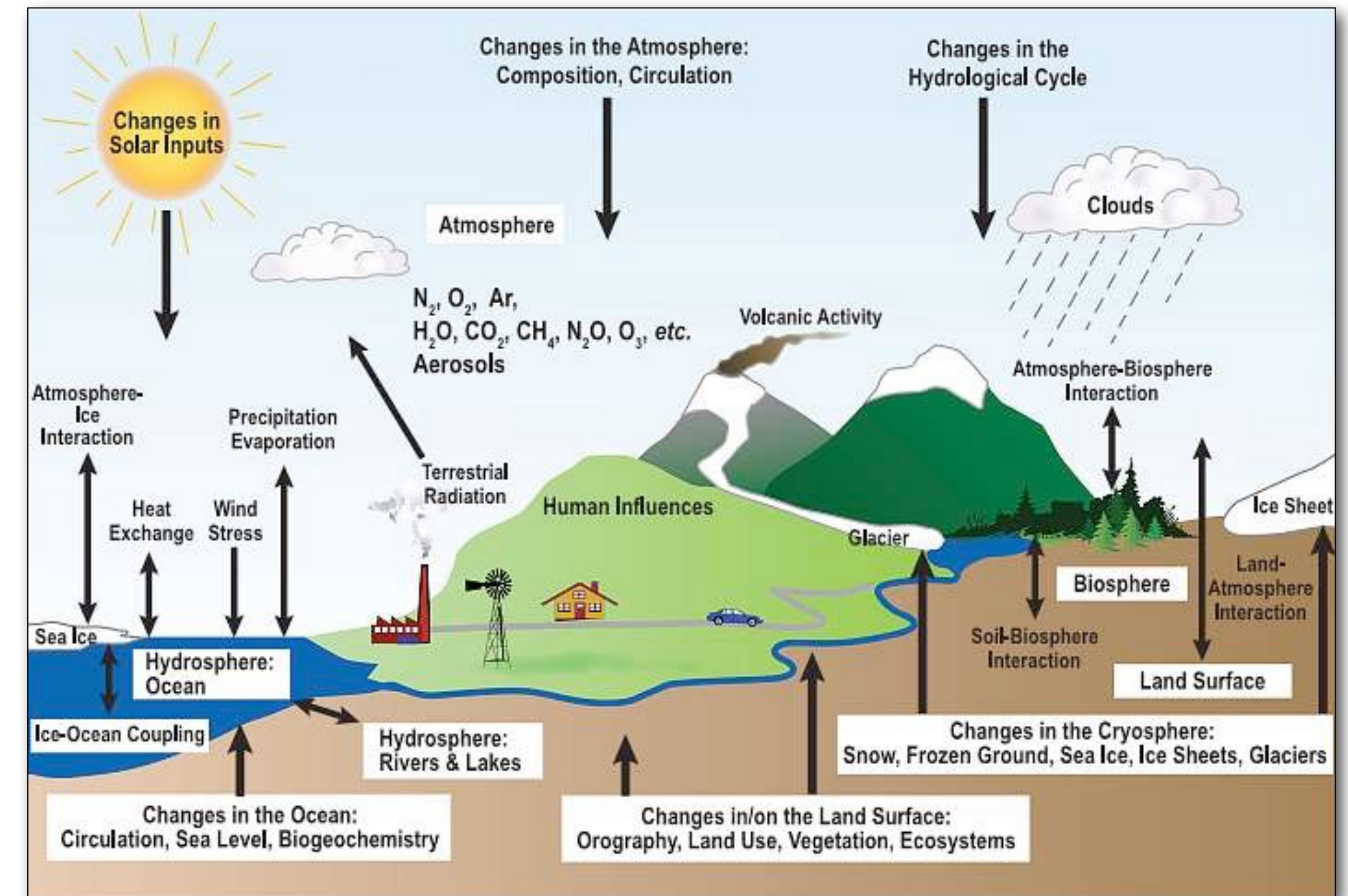


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GLOBAL CLIMATE MODEL



Models are founded on laws of physics

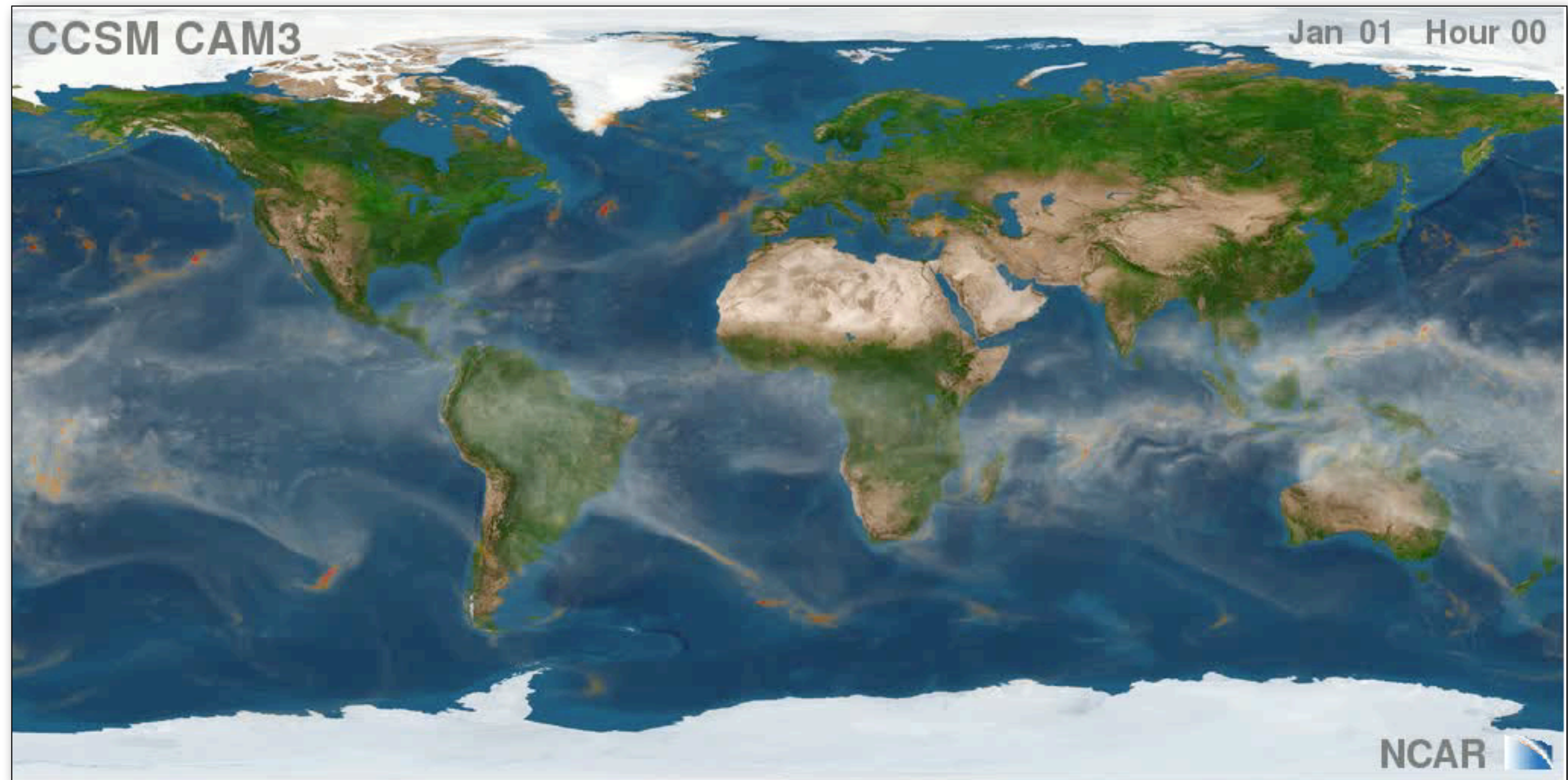


Provide reasonable projections of physical changes, not detailed predictions



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GLOBAL CLIMATE MODEL OUTPUT



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Poll Time!

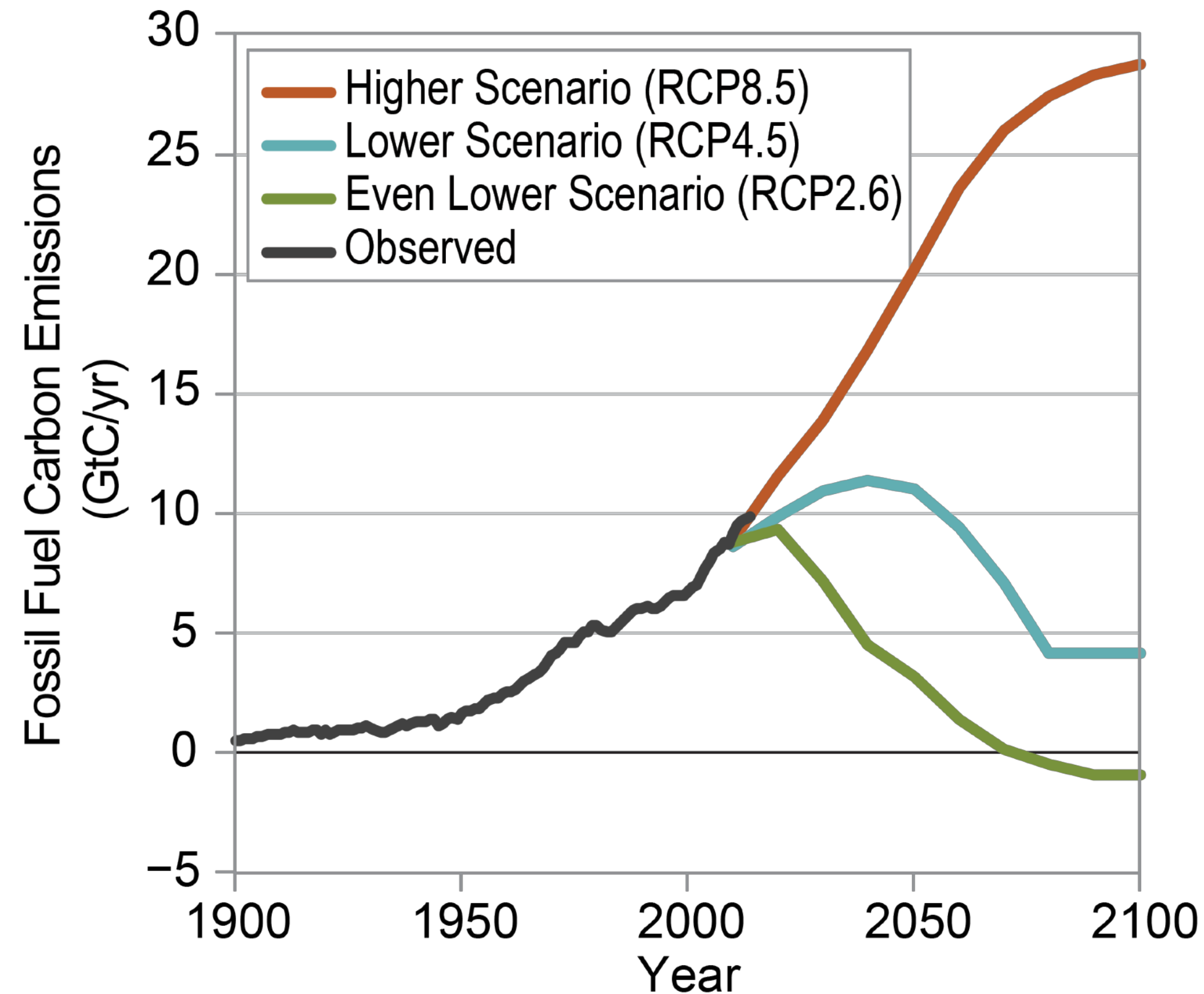
Global Climate Models calculate variables using...

- A) Statistics of weather*
- B) Equations for the basic laws of physics, fluid motion, and chemistry*
- C) Climate reconstructions*
- D) Equations describing the statistical relations between observations and model data*

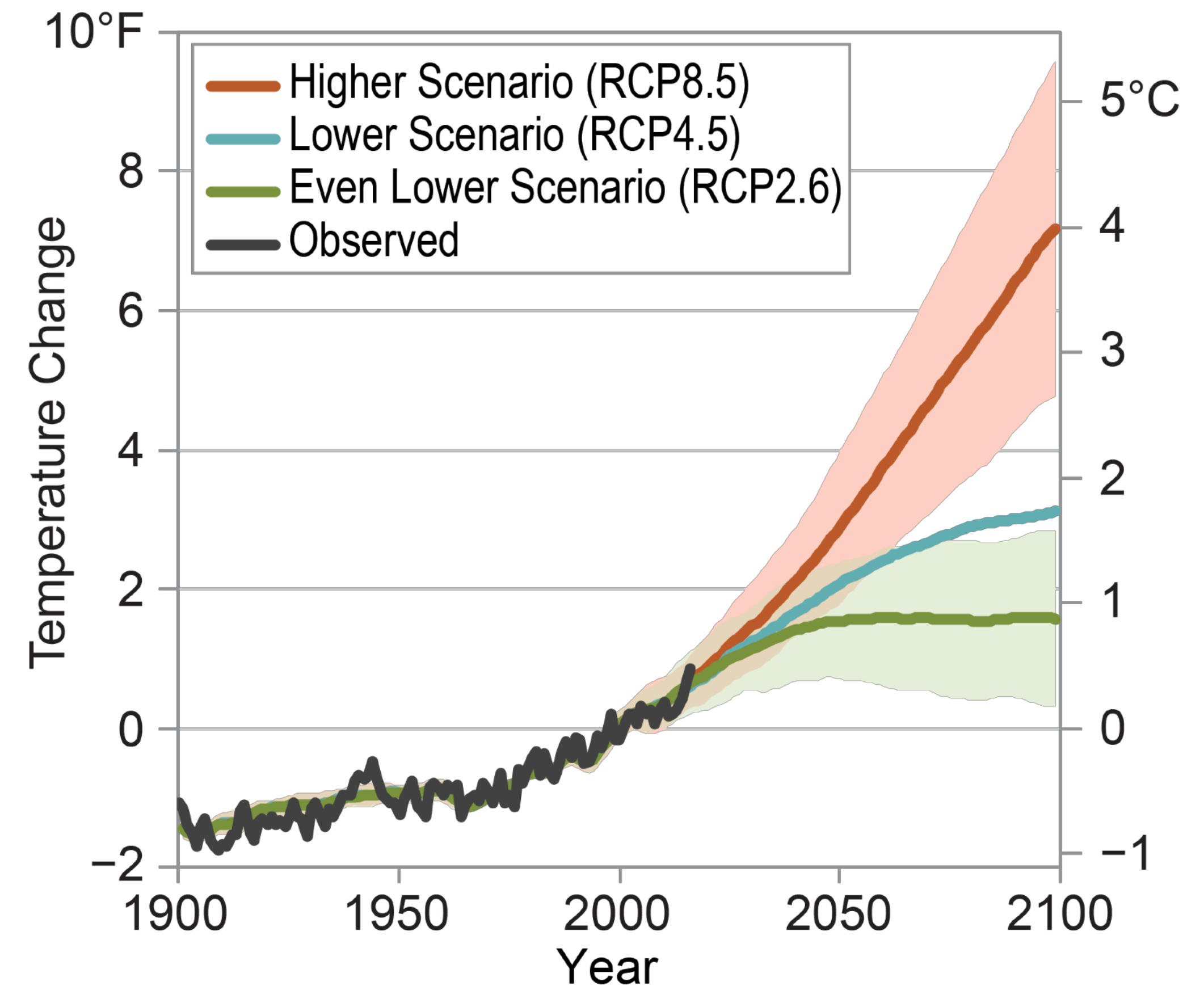


EMISSIONS & TEMPERATURE CHANGE

Global Carbon Emissions



Global Average Temperature Change



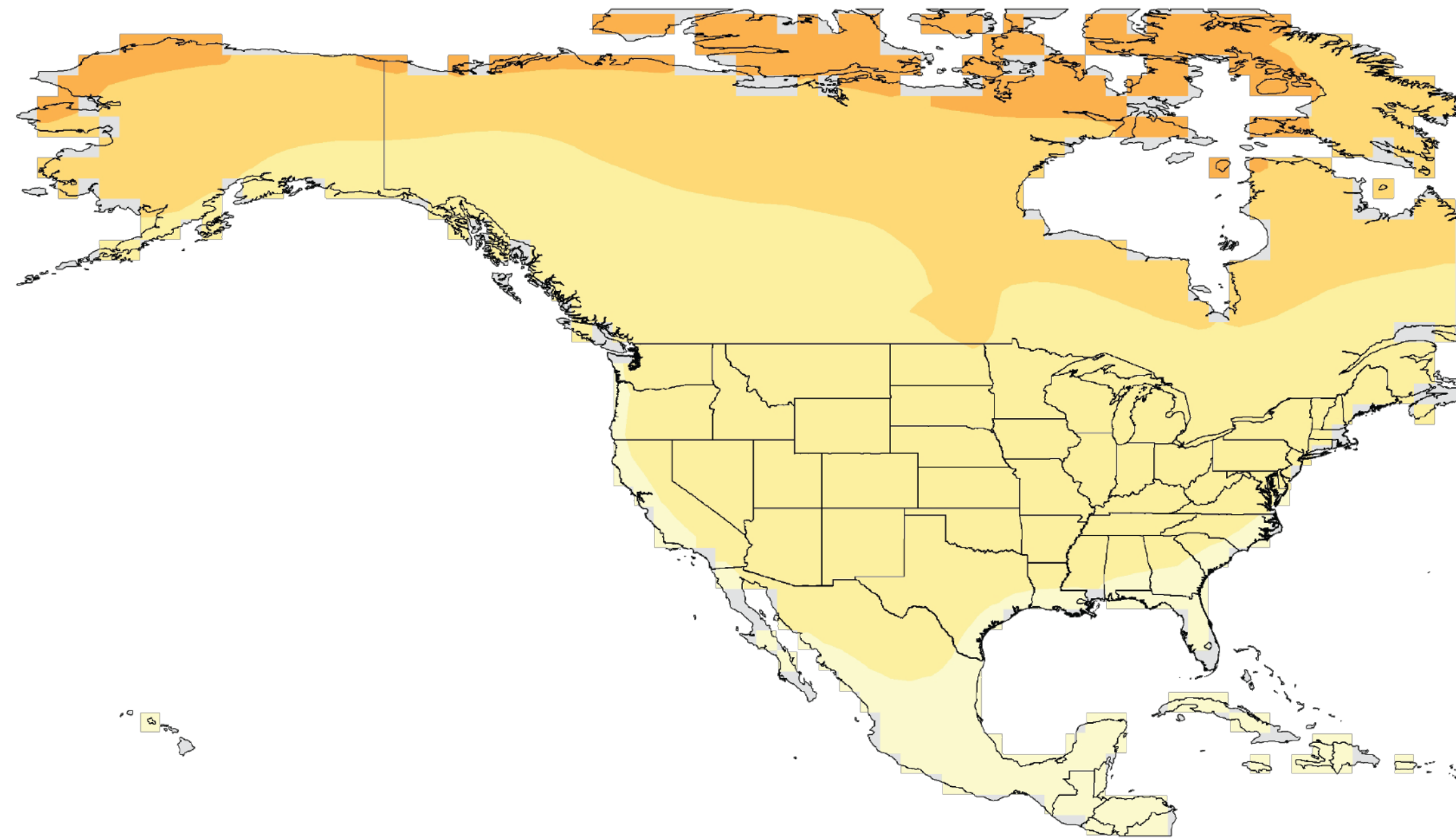
USGCRP CSSR 2017



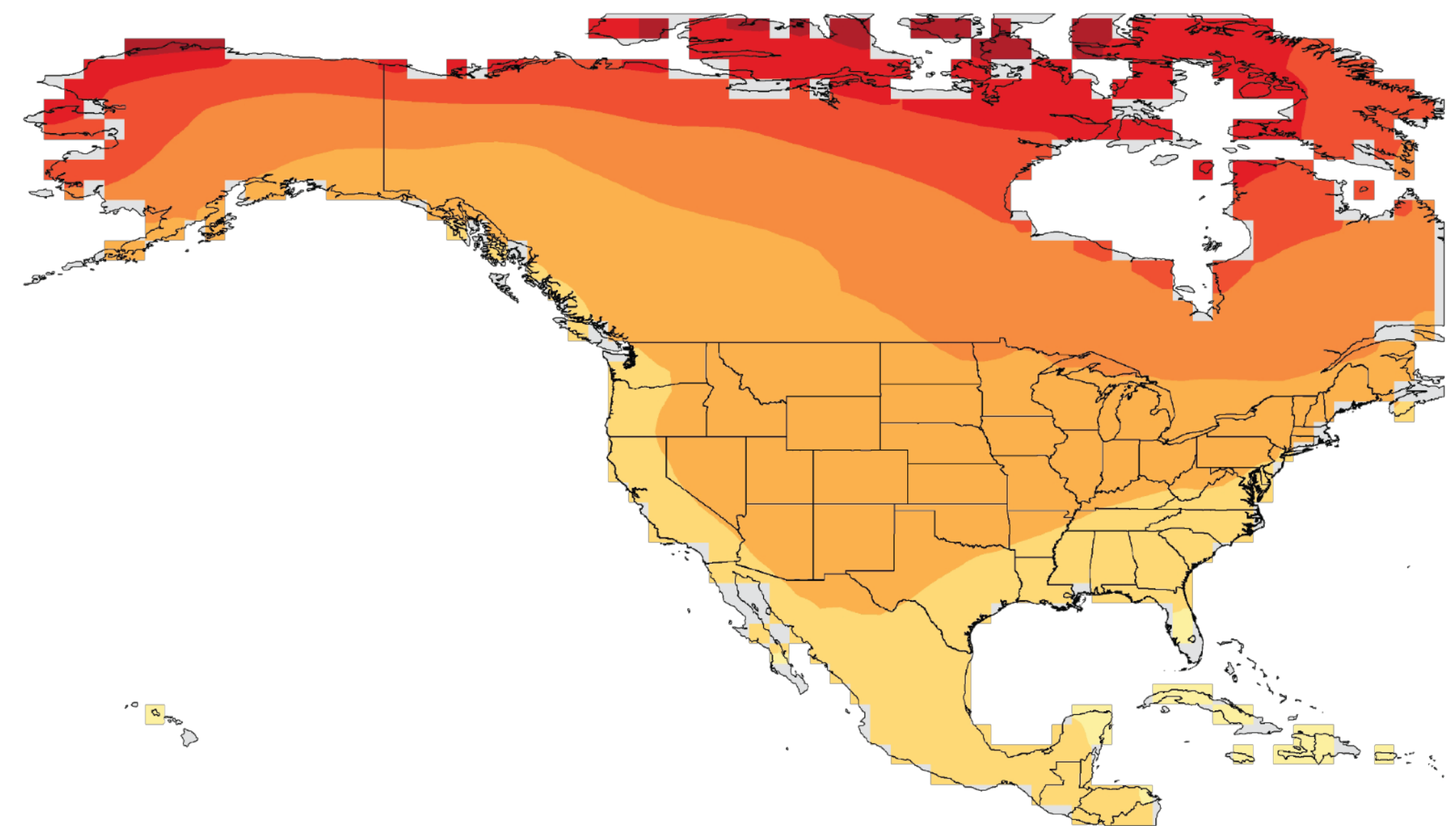
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PROJECTED CHANGES IN AVERAGE ANNUAL TEMPERATURE

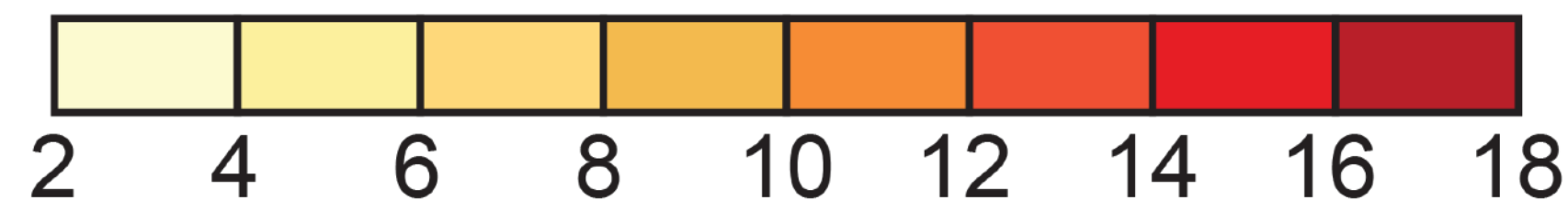
Lower Scenario (RCP4.5)



Higher Scenario (RCP8.5)



Change in Temperature (°F)



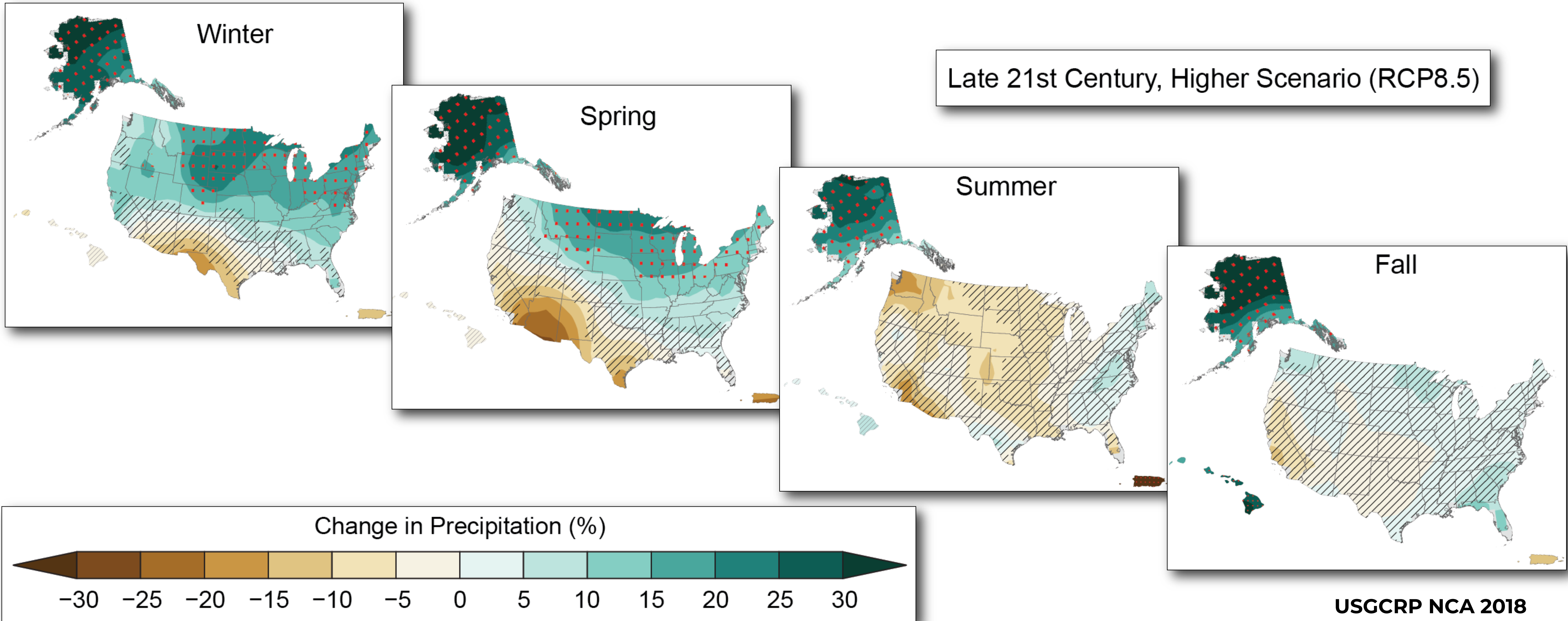
**Projections for the
late 21st century
relative to 1976–2005**

NCA4, Vol 1



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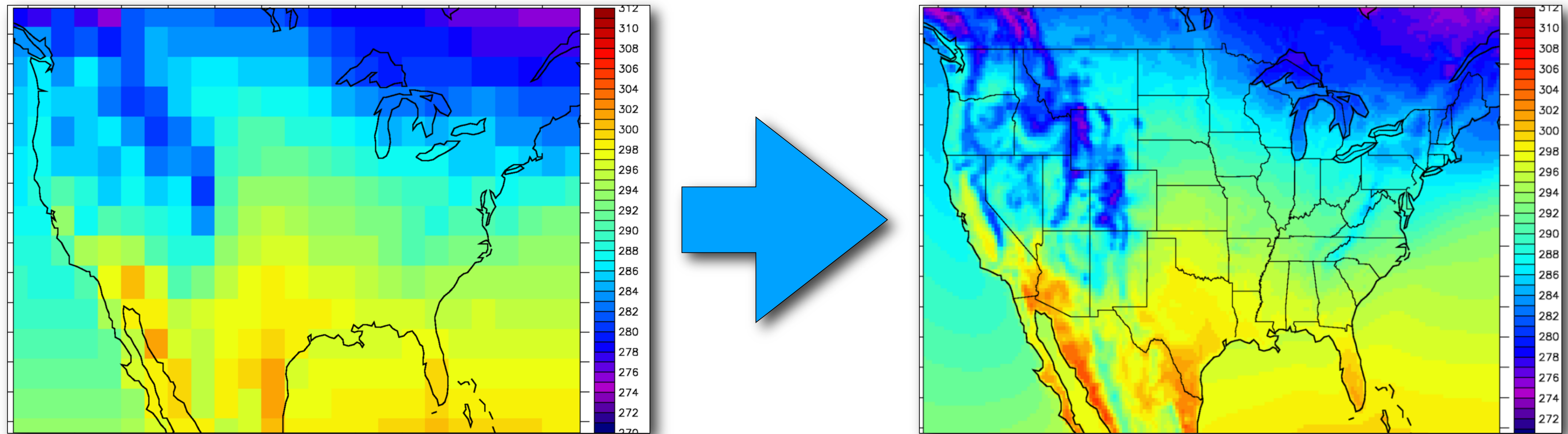
PROJECTED CHANGES IN AVERAGE ANNUAL PRECIPITATION



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DOWNSCALING

- Used to increase the resolution of global climate model
- Helps answer stakeholders' questions about how the climate will change in their location (i.e., impacts assessments) & better represent local climates



Poll Time!

What is a climate change scenario?

- A) The climate change impacts in a certain location*
- B) A possible sequence of events that lead to changes in our future climate*
- C) The sequence of events that have caused past changes in our climate*
- D) A type of global warming model*





REGIONAL CLIMATE PROJECTIONS

MID-CENTURY

2036-2065



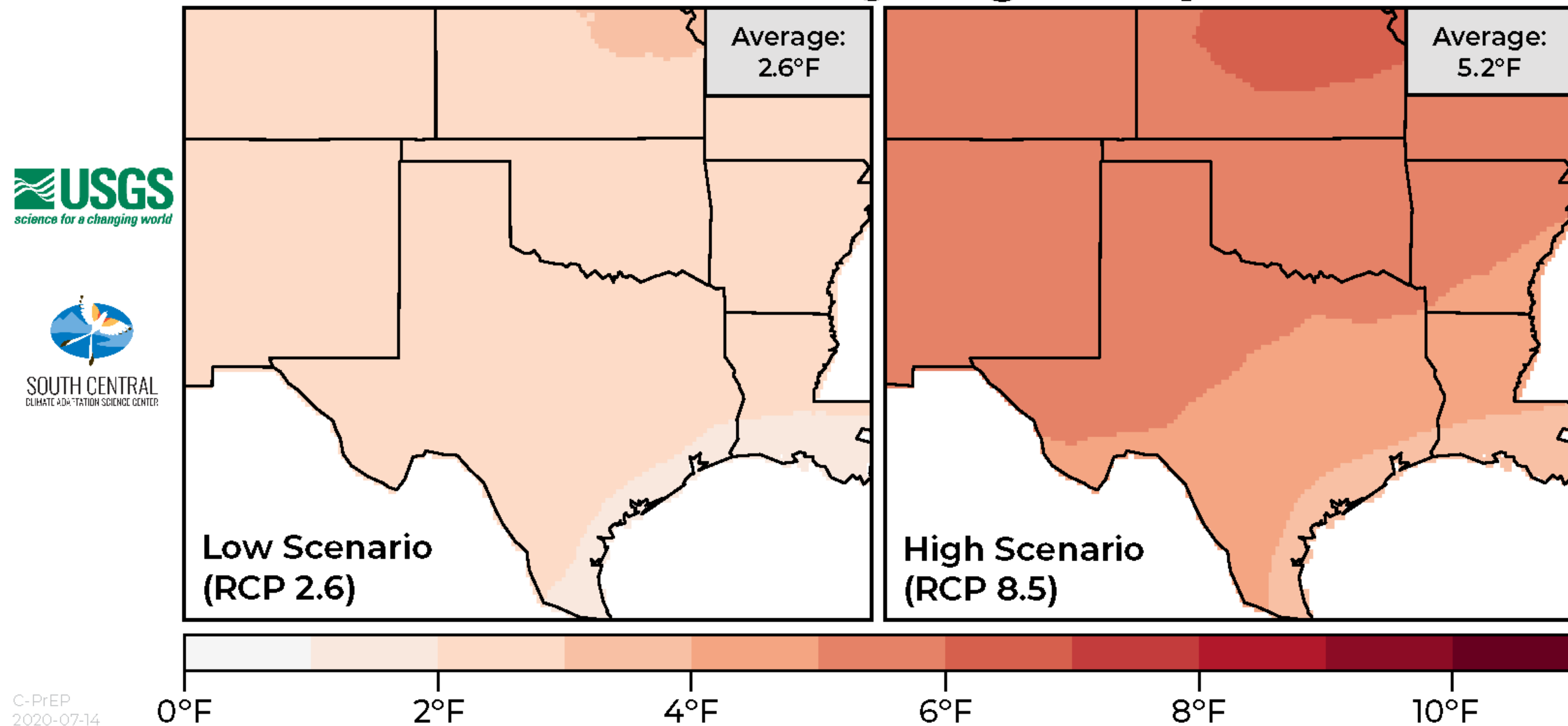
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THE FINE PRINT

- Projections are **NOT** forecasts or predictions
- Our ensemble projections are developed using **three downscaling techniques, three historical observation datasets, and three global climate models**



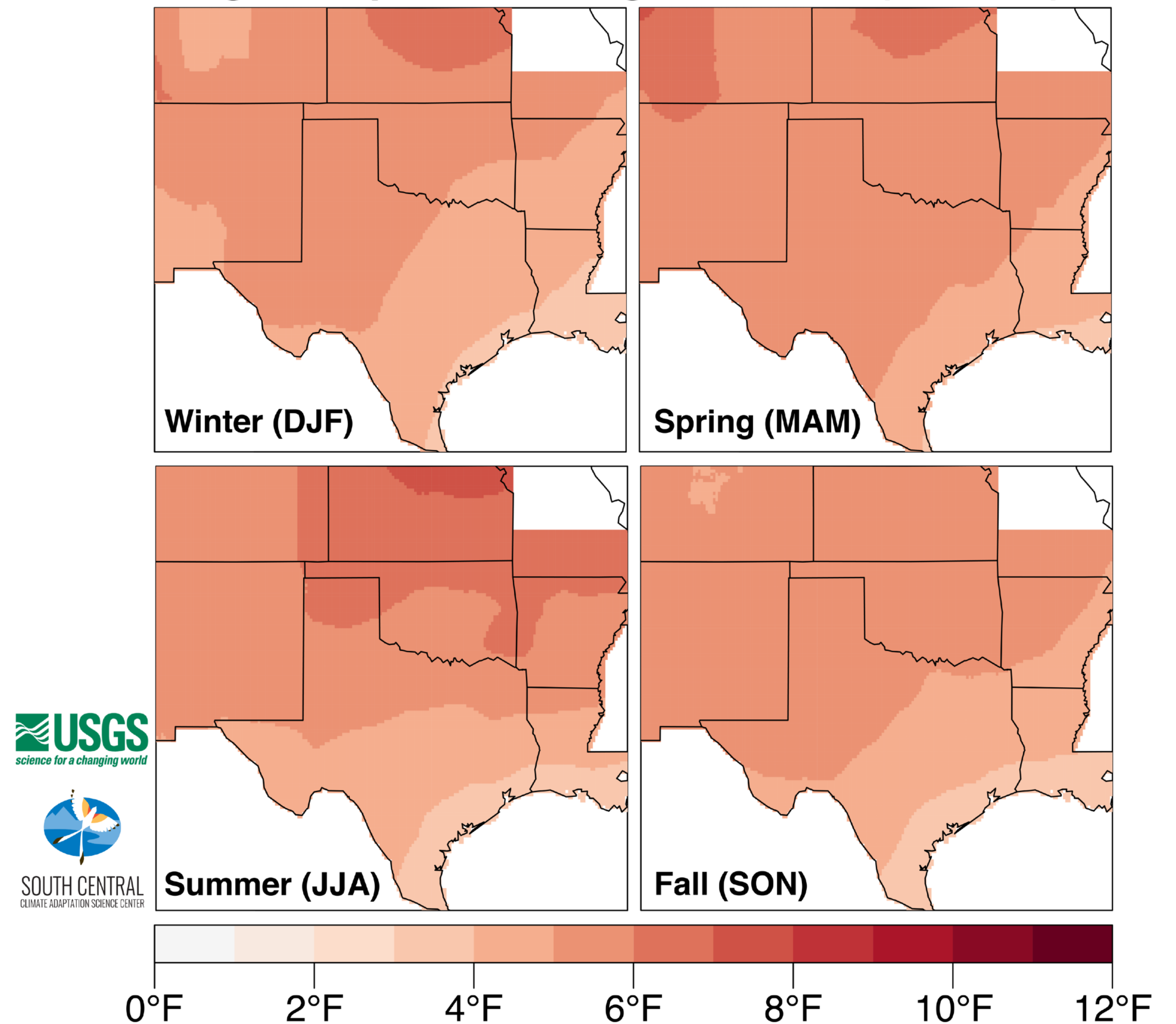
Mid-Century Projected Change of the Annual Average High Temperature



Daily high temperatures averaged for all days during the mid-century are projected to **increase by 2.5°F to 5.5°F** in Oklahoma

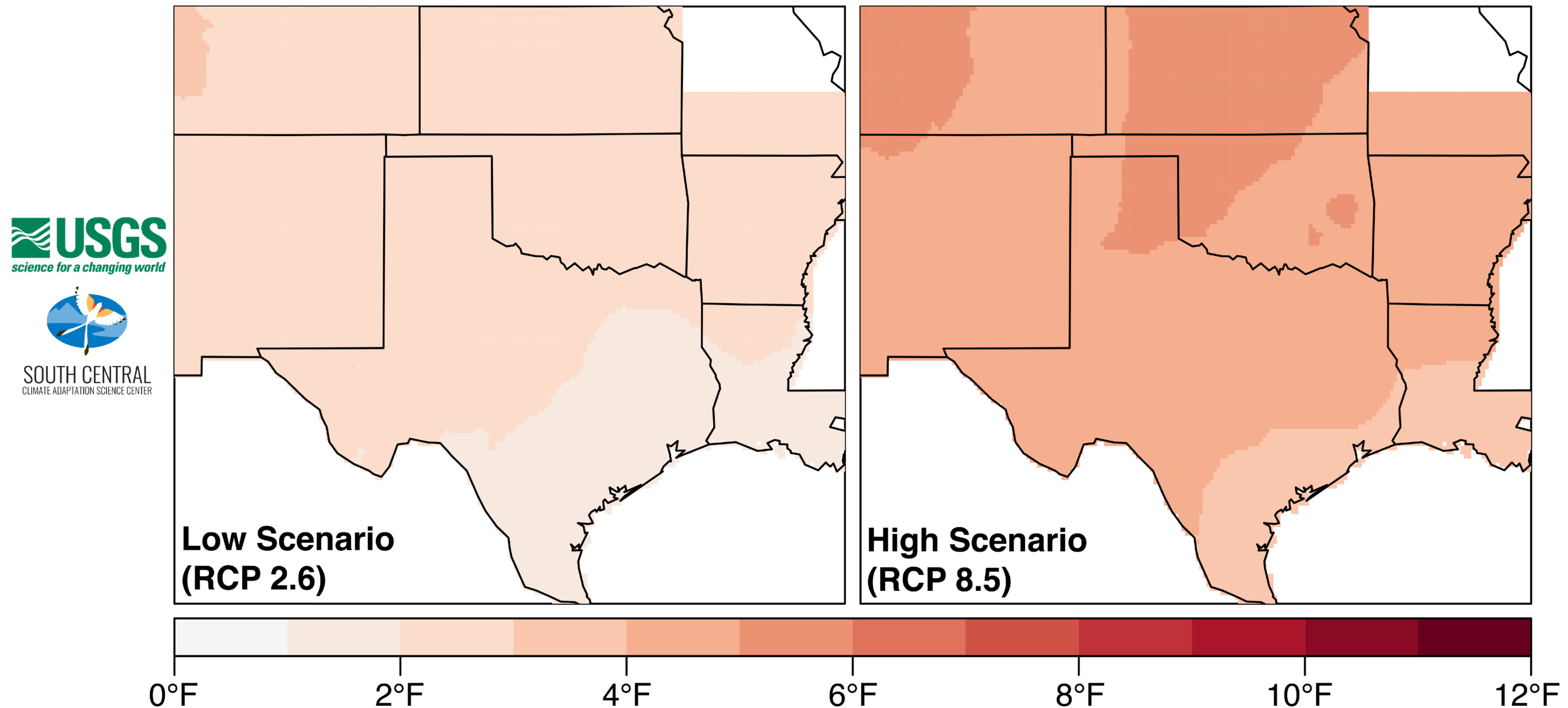
Projected Change (2036-2065) of the Seasonal Average High Temperature - High Scenario (RCP 8.5)

Daily high temperatures projected to **increase more during summer** than other seasons in Oklahoma



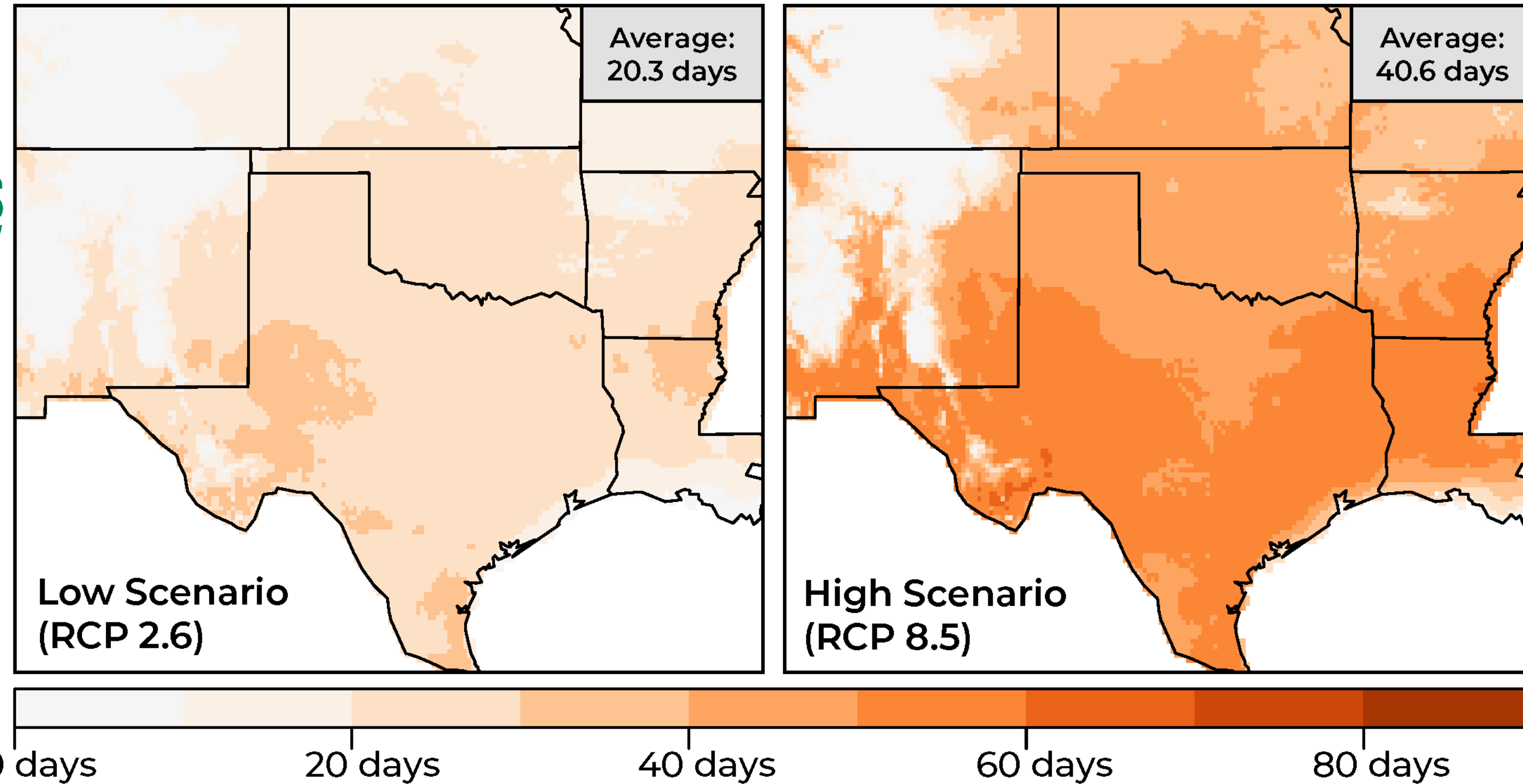
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Projected Change (2036-2065) of the Annual Average Low Temperature



Daily low temperatures averaged for all days during the mid-century are projected to **increase by 2.5°F to 5.5°F** in Oklahoma

Mid-Century Projected Change of the Annual Average Number of Days the High Temperature is Greater than 95°F



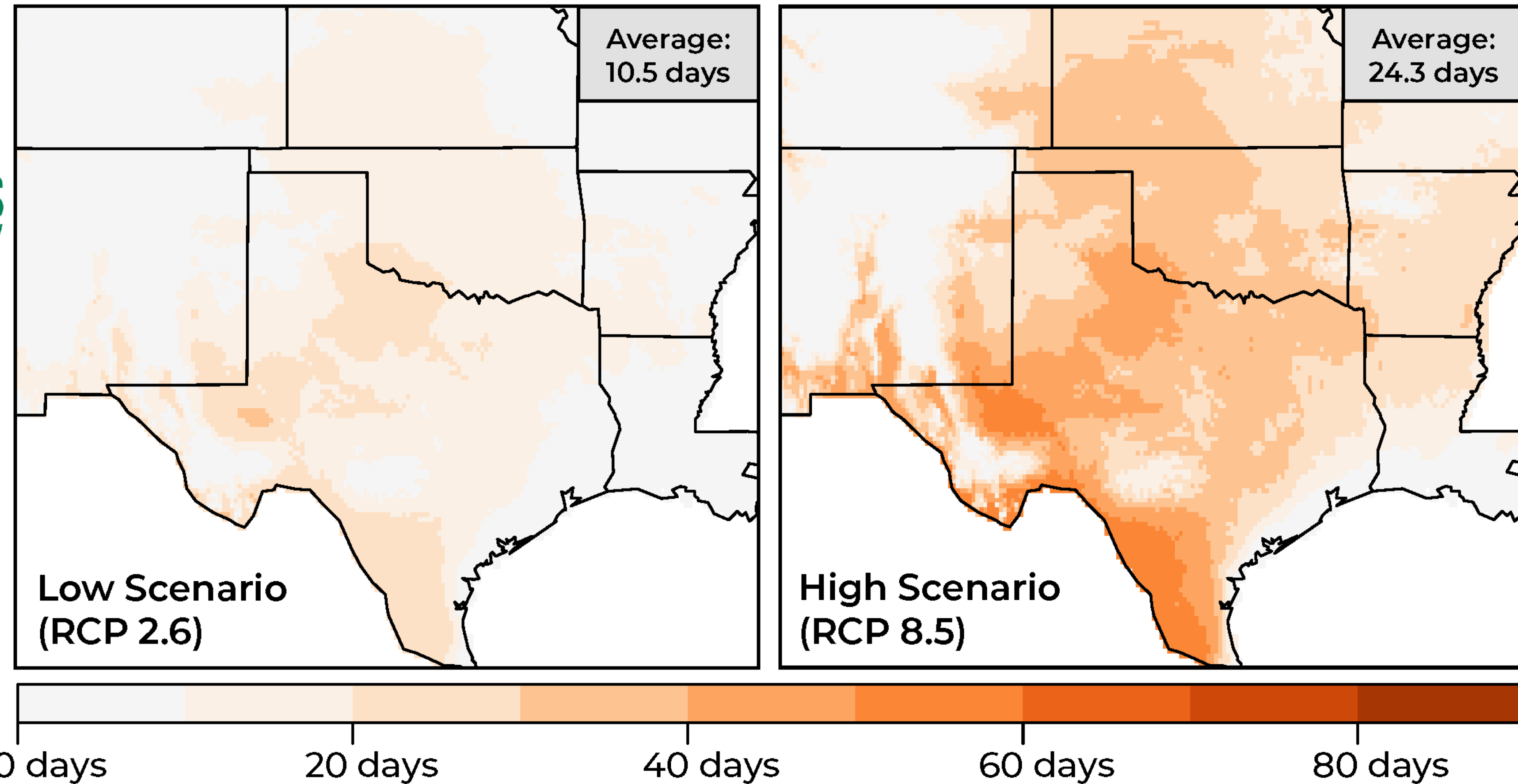
C-PrEP
2020-07-06

Across Oklahoma, the number of hot days ($>95^{\circ}\text{F}$) are projected to **increase by 20-45 days** on average by the mid-century



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Mid-Century Projected Change of the Annual Average Number of Days the High Temperature is Greater than 100°F

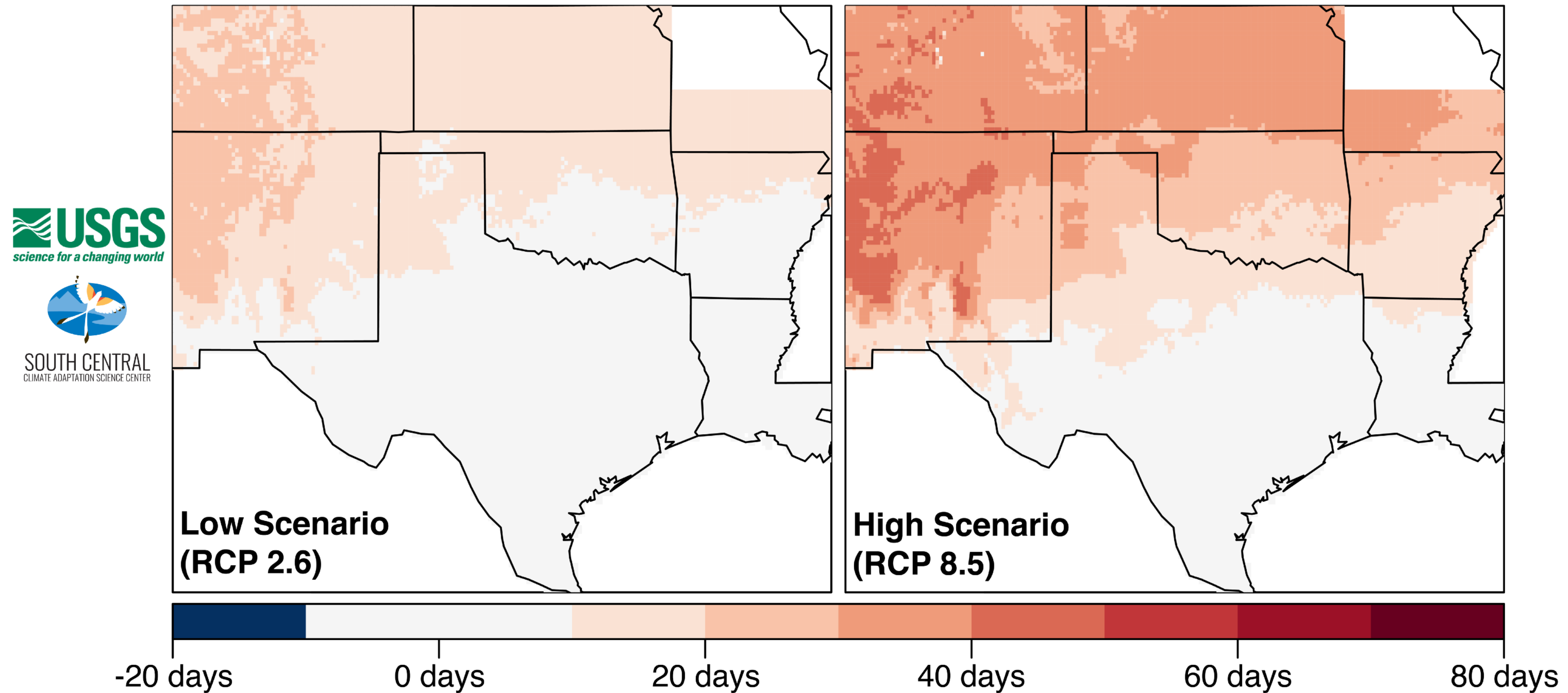


Across Oklahoma, the number of very hot days ($>100^{\circ}\text{F}$) are projected to **increase by 10-40 days** on average by the mid-century



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Projected Change (2036-2065) of the Annual Average Growing Season Length

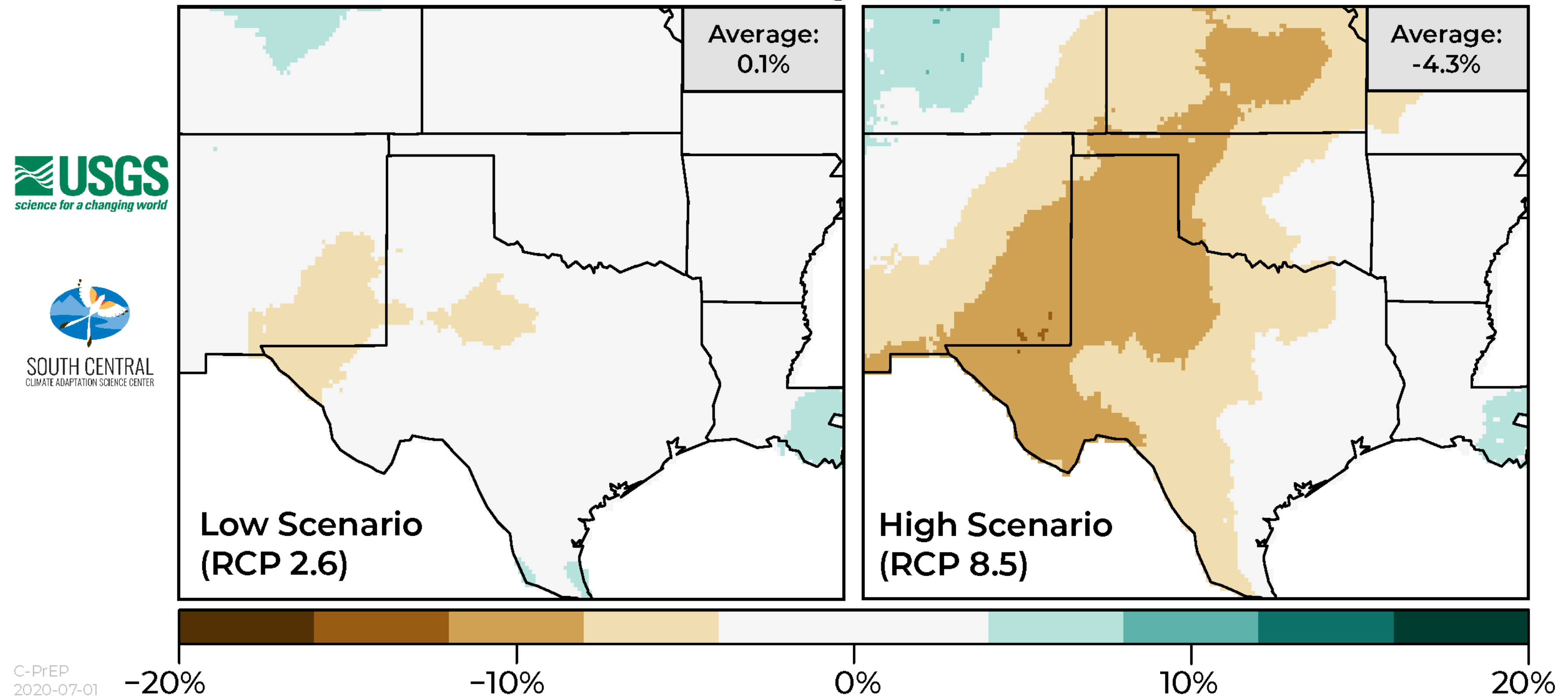


The growing season length (based on temperature) is projected to **increase by 10 to 30 days** on average across Oklahoma by mid-century



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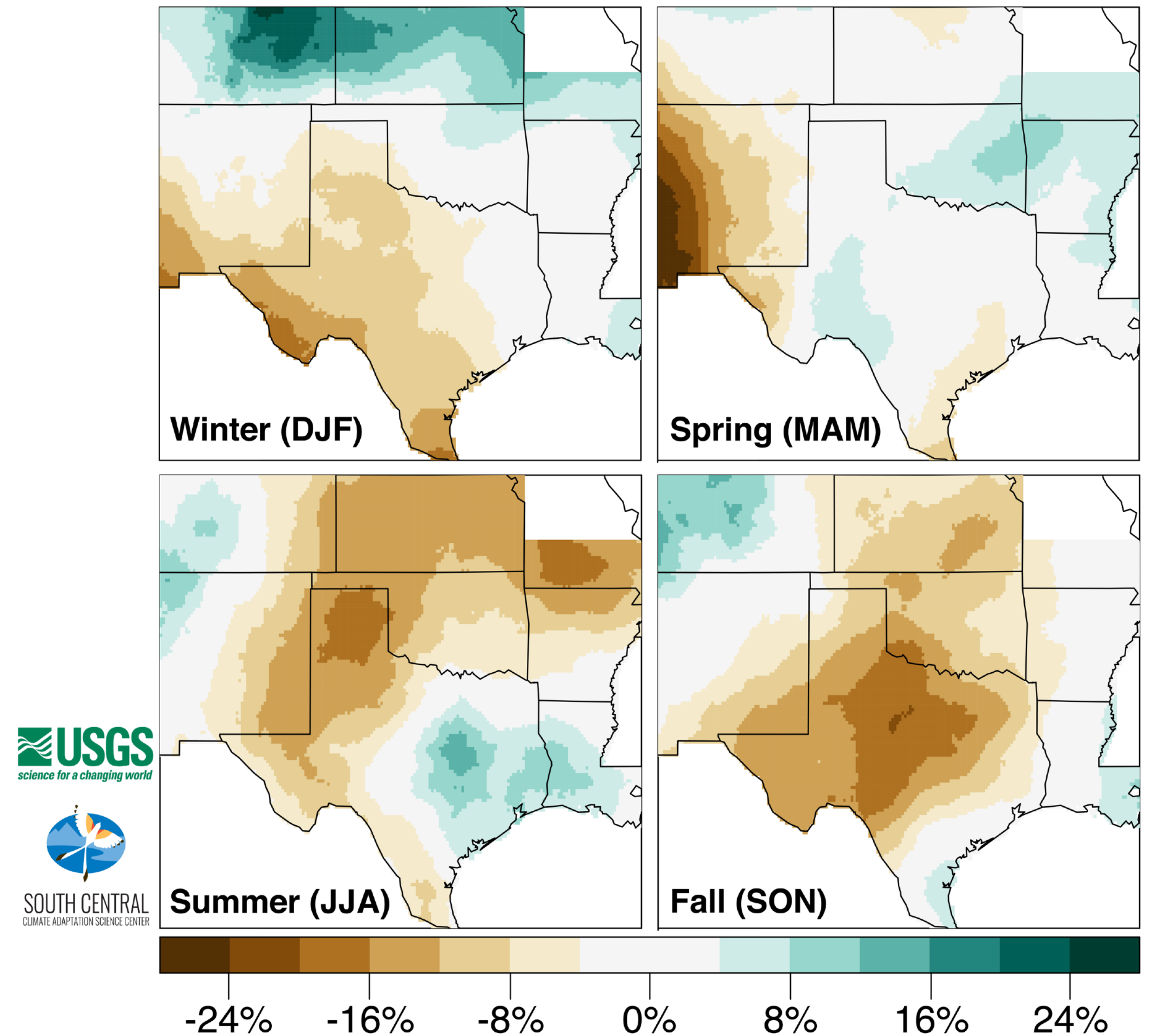
Mid-Century Projected Change of the Annual Average **Total Rain or Snow**



Annual average total precipitation are projected to **decrease by 2% to 10%** across Oklahoma for the high-end scenario

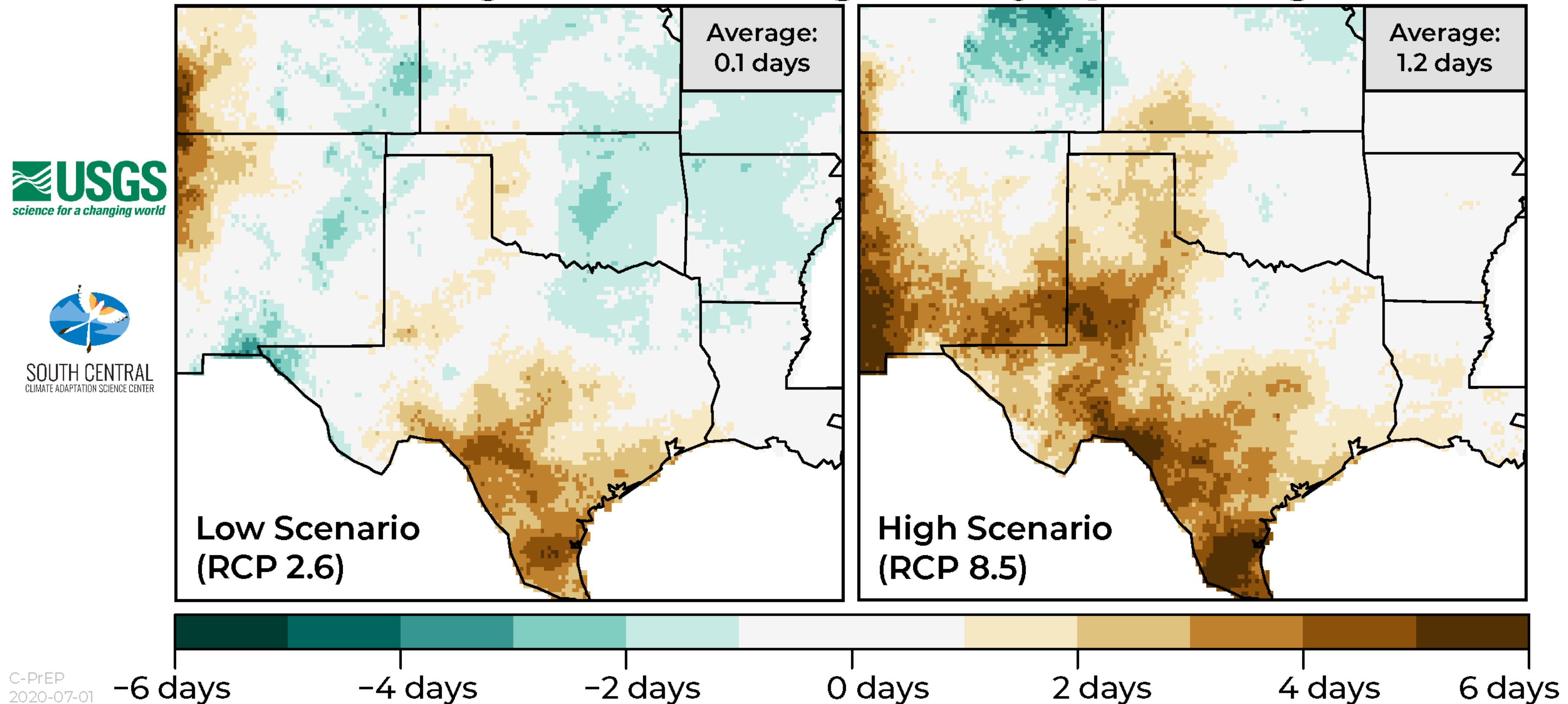
Projected Change (2036-2065) of the Seasonal Average Total Precipitation - High Scenario (RCP 8.5)

Seasonal average total precipitation projected to **decrease more during summer and fall** than other seasons in Oklahoma



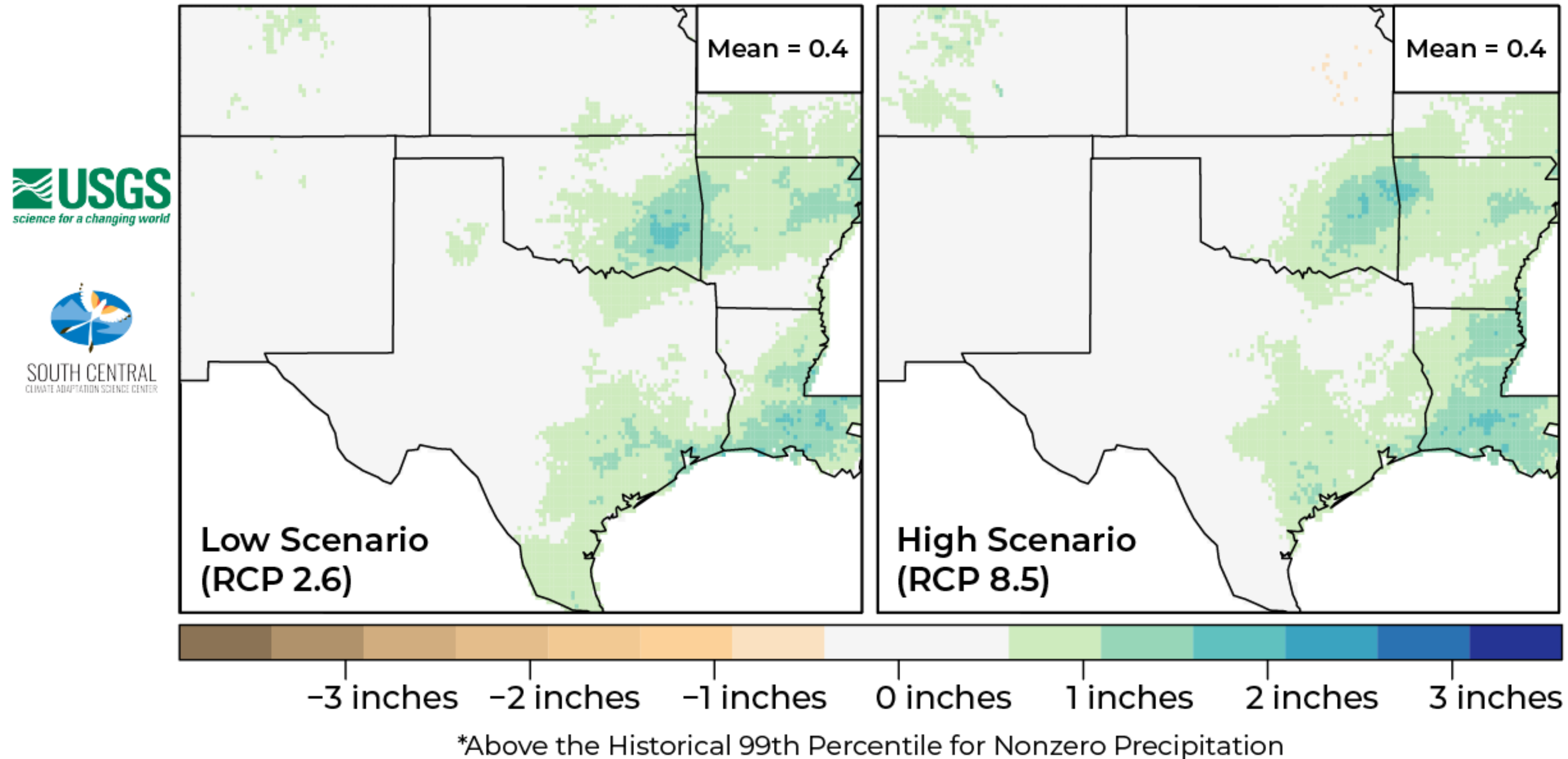
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Mid-Century Projected Change in the Average Annual **Longest Dry Spell Length**



Average annual longest dry spell is projected to **increase by 1-2 days**
across Western Oklahoma by the mid-century

Mid-Century Projected Change in Annual **Exceptional*** Daily Rain or Snow



Average exceptional daily precipitation event is projected to **increase by 1-1.5 inches** across Eastern Oklahoma by the mid-century

Poll Time!

Different climate models will...

- A) Produce difference climate projections*
- B) Produce identical climate projections*
- C) Produce very similar but not identical climate projections*



ADDITIONAL INFORMATION

- Interest in other maps or graphics should be sent to info@southcentralclimate.org or schedule a virtual visit with us to discuss specific needs
- We have end-of-century graphics too (2070-2099)!
- National Climate Assessment: www.globalchange.gov/nca4



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 - climate.ok.gov (OK Climate Survey)
 - www.climate.gov (NOAA)
 - www.climatehubs.usda.gov/hubs/southern-plains (Climate Hub)

QUESTIONS?

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